# Montgomery County, Maryland

# GIS Map Room on the Net

Program Category: Information Technology

## Abstract

An intranet-based "GIS Map Room on the Net" has been constructed to serve all the County departments that are linked to the GIS LAN. Users enjoy instant access to a rich collection of base maps and department-specific maps without the traditional calling around to identify the availability of maps, ordering the composition of custom maps, making trips to pick up maps, and the attendant long delays. Users can now access a wide selection of maps via ubiquitous web browsers. The various map pages were composed using the ArcView GIS and posted to the County intranet using the ArcView GIS Internet Map Server extension. The map pages are organized by departments and, within department, by functional areas. The imbedded Java applets allow map zoom in/zoom out and pan. They also provide attribute queries for the graphic features displayed/selected.

## Need for the Program

County departments deliver services to the citizens by setting up facilities/centers strategically located throughout the County and subdividing the County into service delivery areas that are efficient for the delivery. Maps showing the base features—streets, buildings, parking lots, parks, wooded areas, etc.—and the service facilities and areas are an important aid to service delivery planning and implementation.

With limited resources, it is not possible to maintain map-making staff within each of the County departments. Even with a centralized map-making unit, delays could result due to heavy workload and resource limitation. To provide timely access to many 'standard' maps, the County GIS Team needed to change the mode of delivering the services to the using departments.

The recent advances in Internat/intranet technology and GIS-based web publishing provide a sound foundation on which to build an on-line map access system, internally within the County departments for now and eventually on the World Wide Web.

## Description of the Program

The Geographic Information Systems (GIS) Team, Department of Information Systems and Telecommunications (DIST), of Montgomery County, Maryland, took the initiative of developing the "GIS Map Room on the Net" in the summer of 1997. The hardware platform was Intel Pentium II-based PC and Server running Windows 95 and NT Workstation. The software was based on the ArcView desktop GIS and ArcView Internet Map Server

(AV/IMS) Extension (both from Environmental Systems Research Institute, ESRI, Redlands, California).

The DIST GIS Team (being a county-wide resource) maintains a street centerline-based address range database (GBF/DIME) that also includes the various county service area codes for each record (i.e. street segment) in the GBF/DIME. Using the street centerline coordinates and the associated service area codes, the GIS Team constructed various service area boundaries and created locations (points) coverages of the various county facilities.

Service area boundaries include:

- Board of Elections - Elections Precincts and Districts; Councilmanic, School Board, Legislative, and Congressional Districts
- Montgomery County Public Schools – High-, Middle- & Elementary School Service Areas
- Police Department - Police Districts, Beats, and Reporting Areas
- Fire & Rescue Services - Fire Districts, Response Areas, and Fire Box Areas
- Solid Waste Services - Refuse and Recycling Collection Districts and 'Route Areas;' Yard Trim & Leaf Collection Areas
- County Executive's Office – Regional Service Area
- Health & Human Services Areas
- Recreation Services Areas
- Library Service Areas

Facilities locations include:

- High-, middle- & elementary schools, police stations, fire stations and rescue squads, community centers, health centers, libraries, hospitals, highway services depots, (county run) liquor stores, traffic control cameras, etc.

These GIS data layers (in ARC/INFO coverages) were converted to ArcView Shapefiles and the corresponding "views" composed using ArcView. This ArcView "project," with multiple "views" (one for each department/division), was then posted to the intranet using the AV/IMS Extension.

A table of contents page was constructed to list the departments (and divisions for a larger department) for which map pages have been constructed and are available on the County GIS intranet. Department logos are used to facilitate quick association. (See screen printout attached.) The Montgomery County Public Schools map allows an inquirer to determine the nearest elementary, middle and high school to any street address in the County. Future enhancements will allow the inquirer to further query the 'fact sheets' about the schools.

The Board of Supervisors of Elections map shows the Legislative Districts in Montgomery County. Other categories of election districts are also available for display as indicated in the legends block. A click of the mouse on a specific district brings up a 'fact sheet' about the district, such as the representative's name and phone number. More data such as polling place(s) and registered voters' aggregate profile for the district can be added to the database and made available for on-line query.

Under the Public Works & Transportation section, a user can bring up the County-wide snow removal routes and then zoom into the neighborhood of interest. On the screen printout, the different color shaded areas represent the different 'Snow Route' areas, whereas the routes are depicted by responsibility (State, County, or municipality) and category (emergency route, salt route, grader-plowed, and neighborhood street). This feature can be used by either County staff to plan and monitor the snow plow/salt operation or by citizens concerned with the snow removal or ice treatment for their neighborhoods.

Currently about 60 PC's and 35 Unix workstations are connected to the GIS LAN, allowing a dozen departments/divisions to access these map views of the "GIS Map Room on the Net." In addition, the 1000 County PCs (with browser software installed) that have Internet access can gain access to the 'Map Room' with the addition of NFS Client software which allows a Windows PC to access files (i.e. HTML pages) on an Ethernet map server. The County Internet Web Site (www.co.mo.md.us) will soon double its user accounts to 2,000. Consequently, this intranet-based "Map Room" application is destined to grow. In the longer range, this application will be integrated into the County's Internet Web Site and be accessible by the global community, including the citizens of Montgomery County.

## The Cost of the Program

Hardware and software costs for the project amounted to $24,000. Staff time for the initial development is estimated at one week of network manager's time and four weeks of GIS software analyst's time. The hardware and software maintenance cost is estimated at $3,500 (15%). Staff time for the system maintenance varies depending on how often and the extent of updates and/or expansion.

At the end-user side, a Pentium 200 MHz or higher PC (Windows 95) is recommended, with proper network interface card to communicate with the GIS LAN. Web browser software costs little or free. An 'inkjet' printer ($200 - $500) will produce hardcopy maps.

## The Results/Success of the Program

This new intranet-based GIS application now allows ready access to the most commonly used County base maps and department-specific maps. The using departments can quickly browse these map views and query the underlying data items. Expansion to a much larger community of citizens and users within the County Government has been enabled.

Additional applications have also been enabled. Expanded View collection and query requirements are being collected from using departments. One example pertains to the publishing of the County RideOn Bus Routes and allowing the users to input a location and obtain a route map around that point. A click of the mouse on the route/stop would display the planned arrival times for the route/stop. Another request is for "CIP Mapping" in that a user can query the County's capital improvement program status. The query can be based on the sponsoring department, funding sources, program status, etc. The data stored for the CIP projects would be made available for display. This feature would also enable the sponsoring

department and/or Office of Management and Budget (OMB) to quickly compose and print CIP location maps to be inserted into the Program Description Forms (PDF).

## Worthiness of an Award

This program integrated several technologies—GIS, networking, and web publishing—to enhance the County central GIS/Mapping services to the using departments. As a result, the using departments can quickly and economically obtain many commonly used maps to help them in planning for and monitoring the programs and services. The investment for an end-user is minimal. Web Browser software is free and is already familiar to most PC users. Without this program, a user needing access to GIS maps needs to invest about $2700 ($1000 for ArcView software, $700 for 2-day ArcView training, and $1000 for more RAM to run ArcView and disk space to store ArcView Projects) and 1-2 weeks of learning the ArcView software.

When this program is up-loaded to the County's web site, the benefits will quickly multiply. The public, especially the fifty percents (or more) of 900,000 County residents who can use the World Wide Web to browse and query the various ArcView Views (i.e. maps), would have a much higher level of understanding of the County government programs. They could inquire and obtain County's geographical information and services from the comfort of their homes. Valuable time of citizens and business will be saved.

As for the DIST GIS Team, reduced demand on GIS staff time to service the 'standard' map (and map-based data) requests allowed the GIS Team to devote more time to more specialized requests, which typically have resulted in bigger benefits from the GIS investment.